


# **A Black Carbon Emission Data Base For Atmospheric Chemistry and Climate Studies**

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**Global Climate Research Division**

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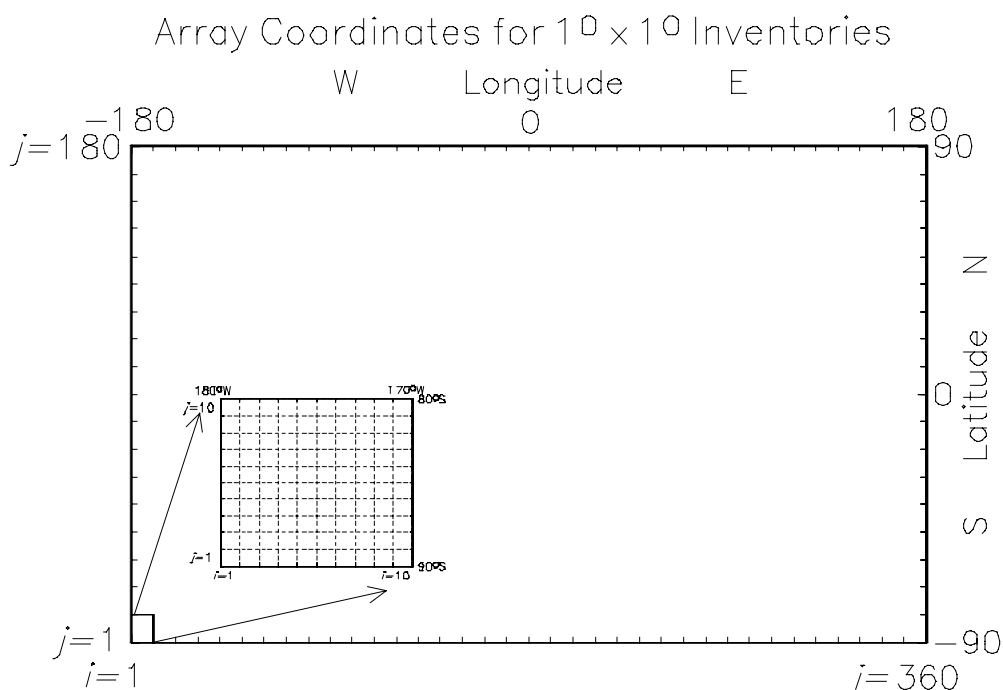
## **Description**

A global data base of black carbon emissions to the atmosphere from fossil fuel combustion has been compiled for the use in atmospheric chemistry and climate studies. The resolution provided is at  $1^\circ$  latitude by  $1^\circ$  longitude based on previous work by Matthews (1983), Lerner et al. (1988), and Dignon (1992). A more extensive description of the assumptions made and emission factors used in this data base can be found in Penner et al. (1993). The original work of Penner et al. (1993) provides the emissions inventory data on a  $5^\circ$  by  $5^\circ$  resolution.

The units of emission for this updated version of the inventory yield a global total of 12.6 TgC/y and are given as the mass in metric tons of carbon for each  $1^\circ \times 1^\circ$  grid. It is important to note that this is not equivalent to a flux, in that the area of the grid boxes vary latitudinally. The emissions are expected to represent the emissions for a typical mid-1980s year. The distribution of emission is based on national totals and then mapped on to the  $1^\circ \times 1^\circ$  grid according to the updated population mapping of Logan (1993). A description of this mapping procedure can be found in Dignon (1988).

The grid for these data bases, (i,j) arrays, is (360,180), which represents 1 degree (lon,lat) resolution. Here,  $j=1,180$  and  $j=1$  represents the latitude band 90 degrees south to 89 degrees, i.e. centered at 89.5 degrees south;  $j=180$  represents the band from 89 degrees north to 90 degrees north, i.e. centered at 89.5 degrees north. Longitude is represented as  $i=1,360$ , where  $i=1$  represents the band from 180 degrees (international date line) to 179 degrees west, i.e. centered at 179.5 degrees west;  $i=360$  is the band from 179

**Figure.** Data base array structure.



degrees east to 180 degrees (date line), i.e. centered at 179.5 degrees east. The accompanying Figure illustrates the structure of the arrays.

The appendix provides a sample FORTRAN code for reading the array. The data file is structured in the IGAC GEIA (International Global Atmospheric Chemistry Global Emissions Inventory Activity) standard format and is anticipated to be officially registered with that group in the near future.

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## References

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Logan, J.A., 1993: manuscript in preparation, for population.

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## Appendix

```
      DIMENSION  BLACKC(360,180)
C*
C*  SKIP TEN LINES OF HEADER
      DO 10 I=1,10
          READ(LUNIT,*)
10  CONTINUE
C*
C*  READ DATA
      DO 20 J=1,180
          DO 20 I=1,360
              READ(LUNIT,1000) BLACK(I,J)
20  CONTINUE
1000 FORMAT (7X,E10.4,1X)
      END
```



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